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| 09/503,041      | 02/11/2000  | Rajiv Laroia         | 14-7-3-3            | 6041             |

7590 05/07/2003  
Ryan & Mason LLP  
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EXAMINER

EMDADI, KAMRAN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2664

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DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/503,041

Applicant(s)

LAROIA ET AL.

Examiner

Kamran Emdadi

Art Unit

2664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 25-47 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Claim Objections***

1. Applicant is advised that should claims 1, 35 and 36 be found allowable, claims 37-47 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 19 and 20 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.
  - Regarding claim 19, "the channel coherence bandwidth" is referred to in a comparison for another value where the channel coherence value has no antecedent basis.
  - Regarding claim 20, the "phase of the coefficients" is not known to the examiner as to how a coefficient can have a component of "phase."

*Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

5. The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).
6. Claims: 1, 8, 9, 11, 12, 13, 18 and 35-47, are rejected under 35 U.S.C. 102(e) as being anticipated by Suzuki (US Patent No. 5970047).
- Regarding claims: 1 and 35-47, Suzuki teaches: a multiple access cellular/wireless environment with a plurality of mobile stations (terminals) communicating with a base station, where the signals are shown separately as correlating to their respective mobile terminal time slots (U0-U5) and timing signals (Figures 3A-3G), with transmission and reception time slots indicating the communication to and from the base station to the mobile users using orthogonal signals (Col 4, lines 39-56).

- Regarding claim 8, Suzuki teaches: a guard time used for separation of signals (Col 4, lines 28-30).
- Regarding claim 9, Suzuki teaches: the base station receiving a signal sampled at a rate of 8 khz.
- Regarding claim 11, It is inherent for a base station timing and access sample window to undergo a process of synchronization with a data sample window of a base station, it is well known in the art that in a mobile system that contains a base station, that a sampling window samples data and synchronization is imminent throughout the data sending and receiving process, therefore it is inherent for a bases station that sends and receives data to synchronize the data based upon what data is preset in the systems aforementioned data window.
- Regarding claim 12, Suzuki teaches: an IFFT and FFT (Figures 14 and 11) used for the twenty-two multitone signals.
- Regarding claim 13, Suzuki teaches: control signals used for timing prepared in advance in the memory (Col 11, lines 25-33).
- Regarding claim 18, Suzuki discloses: spreading the signal in a spread spectrum format (Col 1, lines 65-67).

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a

person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-7, 10, 14, 15, 21-23, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5970047) in view of Schmidl et al. (US Patent No. 6546055).

- Regarding claims 2-7, 10, 14, 15, 21-23, 25 and 26, Suzuki teaches: a mobile communications system with mobile terminals and a base station communicating with orthogonal signaling used for timing signals to be received by the base station by a sample window, for the purpose of simplifying the arduous task of separating multiple transmission signals for reducing interference and providing efficient communication transfers in a mobile environment (Col 2, lines 38-42), but fails to teach of: OFDM implementation, baseband signals as multiples of a window size of a single period, non-overlapping, cyclic prefix used for eliminating multipath dispersion, capturing a period of a sinusoidal signal in the sample window of the base station, using non-overlapping signals, autocorrelation, a ML (Maximum Likelihood) function used for estimating a timing correction, and multipath components prearranged into memory of the base station. Schmidl teaches: an OFDM system that uses sampling windows for synchronization information derivation (Col 4, lines 50-55), with a cyclic prefix used to separate signals and eliminate multipath distortion (Col 5, lines 5-12) an analog sinusoidal signal (Col 6, line 65), a correlation process for the cyclic prefix to indicate a phase shift between data symbols in a multipath environment (Col 7, lines 10-16), a ML function used for estimating the timing (Col 12, lines 14-17)

all for the purpose of achieving better timing and synchronization under one of the embodiments of the invention. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined these two references for a combined process of managing multiple signals while maximizing the speed and processing of the signals and minimizing the interference and probable errors.

- Regarding claim 26, Suzuki teaches: an IFFT and FFT (Figures 14 and 11) used for the twenty-two multitone signals.
9. Claims 16 and 27-34, are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5970047) in view of Schmutz (US Patent No. 5930308).
- 16 and 27-34, Suzuki teaches: all of the above embodiments except a threshold that changes for signal power and signal detection, Schmutz teaches: a cellular phone system with a base station 10 (See Figure) and a dynamic threshold setting arrangement for the variations in signal power used for detection of a signal.
- Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined these two references for a more accurate signal compilation by the receiver, as sought by the disclosed goals of the invention.
10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (US Patent No. 5970047) in view of Schmutz (US Patent No. 5930308) and further in view of Ansbro et al. (US Patent No. 6330294).

- Regarding claim 17, Suzuki teaches: all of the above embodiments except a threshold that changes for signal power and signal detection, Schmutz teaches: a cellular phone system with a base station 10 (See Figure) and a dynamic threshold setting arrangement for the variations in signal power used for detection of a signal. Ansbro teaches: a Chebychev filter as a type of filter used in channel estimation. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the use of a Chebychev filter with the channel estimation process used in the receiver of the mobile station.

*Allowable Subject Matter*

11. Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. The following is a statement of reasons for the indication of allowable subject matter:  
Although the Maximum likelihood function employs an eigenvector analysis in some descriptions of the function found online in scholarly papers and related sources, the average auto-correlation feature represented by eigenvectors, where the average is taken over the randomness of the multipath channel and signal noise, is unique to the art and is thus allowable under a rejected mothering claim.



*Conclusion*

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Crawford (US Patent No. 6549561) OFDM tracking for a LAN.
- Sayeed (US Patent No. 6456653) Estimation for OFDM.
- Barton et al. (US Patent No. 6449246) Multicarrier PCS.
- Keevill et al. (US Patent No. 6359938) OFDM digital receiver.
- Wang et al. (US Patent No. 6266365) CDMA receiver.
- Zhang et al. (US Patent No. 6178215) Synchronization system.
- Baum et al. (US Patent No. 5867478) OFDM system.
- Baum et al. (US Patent No. 5802044) Synchronization system and device.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kamran Emdadi whose telephone number is (703) 305-4899. The examiner can normally be reached between the hours of 8am and 5pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wellington Chin, can be reached at (703) 305-4366. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9314 for regular communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

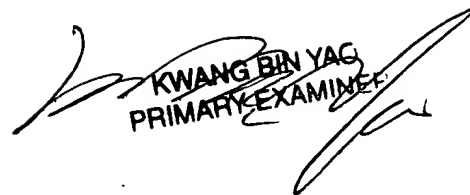
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KWANG BIN YAG  
PRIMARY EXAMINER